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CH2M HILL

Celebrating 50 Years

May 28, 1996

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W.A. No. 52-3PL7

Mr. Eric Newman
U.S. EPA, Region III
841 Chestnut Street (3HW42)
Philadelphia, Pennsylvania 19107

Dear Eric:

Subject: Halby Chemical OU1 Expedited Response Action Oversight - Review of PRP Progress Report - Treatability Study

We have reviewed the progress report on the treatability study (dated May 8, 1996) and provide the general and specific comments and questions below.

General Comments

The progress reports are poorly organized. Each starts out with a list of numbered tasks performed but the numbered items also include results, which may not be repeated in later sections on results and discussions. The reports could be written to more-clearly discuss the work performed (and how it does or does not conform to the work plan), the results, and the relevance of the results to the remediation.

As stated in our review of the Screening Treatability Study Work Plan (submitted to you on April 18, 1996) our understanding is that sodium perborate tetrahydrate proposed as an oxidant likely will generate large quantities of boron, which may cause deleterious ecological effects. Use of this and similar chemicals as oxidants should be examined closely for such effects. We suggest that boron and any other chemicals of potential concern be analyzed for in the soil and residual water after the reaction is completed to determine if their concentrations may represent an ecological risk. Has any consideration been given to the effects of the reactions on the bioavailability of other chemicals, particularly inorganics?

Mid Atlantic Office 625 Herndon Parkway, Herndon, VA 20170-5416 703 471-1441
P.O. Box 4400, Reston, VA 20190-1483 Fax No. 703 481-0980

Only the stoichiometry for carbon disulfide combined with hydrogen peroxide is described. The appropriate reactions with the other oxidants and the buffers should be discussed. It is not possible to verify whether or not the appropriate amounts of oxidant and buffer are being added without the equations of the reactions being spelled out.

Water was added to each reaction vessel. Is the treatment really treating a slurry rather than soil? Was the residual water analyzed along with the soil to determine the distribution of carbon disulfide between phases? Some of the reduction in the concentrations of carbon disulfide in the soil may be due to partitioning into the water phase rather than reacting to form other chemicals.

The work plan refers to two laboratory phases. Do Progress Reports No. 1 and No. 2 discuss the activities and results of the first phase and further work is in the second phase?

Specific Comments

Progress Report No. 1

- Under Item 1, why were tests run on surrogates of Halby samples? This was not discussed in the work plan.
- It should be clearly delineated which tasks were performed on surrogate samples and which tasks were performed on samples from the site. The assumption is that tasks 1 through 7 relate to surrogate samples and tasks 8 through 11 relate to Halby samples, but this is not clear.
- Do the data in the table apply to the surrogate samples, Halby samples, or both?
- For the 100-gram sample, Na_2CO_3 is likely combined with H_2O, not with H_2O_2.

Progress Report No. 2

- The work plan stated that 500 grams of soil would be used in the tests, but only 100 grams were used (Task 7). Was there a rationale for this deviation?
- In Task 8, it is unclear what experiment was made at "constant temperature" to investigate volatilization "when the reaction temperature was allowed to reach the 60-70°C level." This sounds contradictory. This step was not discussed in the work plan.
- In Task 9, was the initial temperature of the sample for the percarbonate addition really 0°C? What happened to trying to reproduce site conditions? Is it likely that such low temperatures may prevail at the site during remediation? When the temperature reached 34°C, was it maintained at that temperature artificially or is that the temperature at which the reaction equilibrated? This step was not discussed in the work plan.

- The progress report provides a compelling argument for eliminating peroxide as a likely oxidant for the remediation.

- In Result 8, it is stated that the "reagents react readily with contaminants." Which contaminants are being referred to? If contaminants other than carbon disulfide are being addressed, these should be identified.

- Also in Result 8, it is stated that "the powders are added at the top of the soil mass." The work plan stated that the soil and oxidants would be mixed. Is this a deviation from the work plan?

Please call me at 703/471-6405, ext. 4324, with any questions regarding this review.

Sincerely,

CH2M HILL

Robert W. Root, Jr.
Site Manager

CC: Jane Biggs Sanger/DE DNREC

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